

What is Claimed:

1. An apparatus for heating at least one fuel cell, comprising:
at least one fuel cell;
a resistive conductor attached to a source of electricity;
at least one current control component that modifies the amount of electrical current flowing in said resistive conductor; and
an insulating material that surrounds said at least one fuel cell and said resistive conductor.
2. An apparatus according to claim 1, wherein the at least one fuel cell comprises at least one fuel cell stack.
3. An apparatus according to claim 1, wherein said resistive conductor contains metal.
4. An apparatus according to claim 1, wherein said source of electricity is at least one of a battery, a fuel cell, and a power cord attached to a conventional wall plug.
5. An apparatus according to claim 1, wherein said at least one current control component includes at least one temperature transducer.
6. An apparatus according to claim 1, wherein said at least one current control component includes at least one ammeter for measuring the output of the at least one fuel cell.
7. An apparatus according to claim 1, wherein said at least one current control component includes a smart controller for automatically modifying the amount of electrical current in said resistive conductor.
8. An apparatus according to claim 7, wherein said smart controller includes a host interface for communications with a computer.
9. An apparatus according to claim 1, wherein said at least one current control component includes a switch capable of switching electrical current on and off.

10. An apparatus according to claim 1, wherein said at least one fuel cell includes at least one solid oxide fuel cell.
11. An apparatus according to claim 1, further comprising a smart controller capable of monitoring and controlling fuel delivery into the at least one fuel cell.
12. A method for heating at least one fuel cell, comprising:
positioning a resistive conductor in proximity with said at least one fuel cell;
coupling said resistive conductor to a source of electricity;
surrounding said at least one cell and said resistive conductor with an insulating material;
and
modifying the amount of electrical current in said resistive conductor to maintain a target operating temperature of the at least one fuel cell.
13. A method according to claim 12, wherein said resistive conductor contains metal.
14. A method according to claim 12, wherein said source of electricity is at least one of a battery, a fuel cell, and a power cord attached to a conventional wall plug.
15. A method according to claim 12, wherein said modifying includes receiving the input from at least one temperature transducer further to maintaining the target operating temperature.
16. A method according to claim 12, wherein said modifying includes measuring the output of the at least one fuel cell via at least one ammeter further to maintaining the target operating temperature.
17. A method according to claim 12, wherein said modifying includes automatically modifying the amount of electrical current in said resistive conductor via a smart controller.
18. A method according to claim 12, wherein said modifying includes switching the current in said resistive conductor on and off.
19. A method according to claim 12, further comprising regulating the flow of fuel to said at least one fuel cell.

20. A method according to claim 12, wherein said at least one fuel cell includes at least one solid oxide fuel cell.
21. A method according to claim 12, wherein said positioning includes positioning a resistive conductor in proximity with at least one fuel cell comprising at least one fuel cell stack.
22. Apparatus for heating a fuel cell or fuel cell stack, comprising:
at least one fuel cell; and
a resistive conductor coupled to a source of electricity, wherein the resistive conductor is positioned proximally to said at least one fuel cell to heat the at least one fuel cell to a target temperature.
23. An apparatus according to claim 22, wherein said at least one fuel cell and said resistive conductor are surrounded by insulation.
24. An apparatus according to claim 22, wherein said resistive conductor is coupled to a source of electricity via a connecting wire.
25. An apparatus according to claim 22, wherein the electrical current in said resistive conductor is automatically controlled by a smart controller.
26. An apparatus according to claim 25, wherein said smart controller also controls a fuel pump.
27. An apparatus according to claim 25, wherein said smart controller includes a host interface for communications with a host computer.
28. An apparatus according to claim 22, further comprising at least one sensor for measuring the temperature of the at least one fuel cell.
29. An apparatus according to claim 22, wherein said at least one fuel cell comprises at least one fuel cell stack.
30. An apparatus according to claim 22, further comprising an ammeter for measuring the electrical output of the at least one fuel cell.

31. Apparatus for starting at least one fuel cell, comprising:
at least one fuel cell;
a smart controller;
a resistive heating circuit positioned in substantial proximity with said at least one fuel cell; and
at least one of a switch, a variable resistor, a variable transformer and a pulse width modulation scheme, wherein said at least one of a switch, variable resistor a variable transformer and a pulse width modulation scheme is operated by said smart controller to modify the electrical current in said resistive heating circuit.
32. An apparatus according to claim 31, further comprising a temperature transducer for supplying said smart controller with temperature information from said at least one fuel cell.
33. An apparatus according to claim 31, further comprising a voltage sensor for supplying said smart controller with voltage information from said at least one fuel cell.
34. An apparatus according to claim 31, further comprising a fuel pump, wherein said fuel pump is electronically coupled to said smart controller.
35. An apparatus according to claim 31, wherein said smart controller includes a host interface for communication of with a host computer.
36. An apparatus according to claim 31, further comprising a fuel pump, wherein said fuel pump begins pumping fuel to said at least one fuel cell when said at least one fuel cell attains a target operating temperature.
37. Apparatus for heating at least one fuel cell, comprising:
means for coupling a resistive conductor positioned in proximity with at least one fuel cell to a source of electricity;
means for surrounding said at least one cell and said resistive conductor with an insulating material; and
means for modifying the amount of electrical current in said resistive conductor to maintain a target operating temperature of the at least one fuel cell.